

國立屏東教育大學 101 學年度學士班轉學考試

微積分 試題

(應用數學系/資訊科學系/應用物理系/電腦與智慧型機器人學士學位學程)

*注意事項：

- (1) 本試題共 1 頁，答案請「橫式」書寫，並依規定上下翻頁，否則不予計分。
(2) 不必抄題，但請依序將題號標出，並寫在答案紙上。

1. Find $\frac{dy}{dx}$ if $4x^2y - 3y = x^3 - 1$. (10%)

2. Solve $\frac{dy}{dx} = \frac{x + 3x^2}{y^2}$. (10%)

3. Evaluate $\int_{-2}^5 \int_0^{3x+2} \int_y 4dzdydx$. (10%)

4. Find the volume bounded by $3x + 6y + 4z - 12 = 0$, xy -plane, xz -plane and, yz -plane. (10%)

5. Prove that $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{3^n}{n!}$ converges absolutely. (10%)

6. Find the derivative of $f(x) = \sin[\cos(x^2)]$. (10%)

7. Find the equation of the tangent line to the curve $y^3 - xy^2 + \cos xy = 2$ at the point $(0,1)$. (10%)

8. Find $\int x \sin x dx$. (10%)

9. Find $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2 + x}$. (10%)

10. What is the interval of convergence for $\sum_{n=0}^{\infty} \frac{(x-1)^n}{(n+1)^2}$. (10%)